

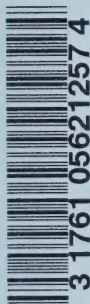
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Abernathy, Tom O'Grady, Bill
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**Exposure to ETS in
Public Places:
An Exploratory Study**

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**Exposure to ETS in
Public Places:
An Exploratory Study**

Working Papers Series No. 16

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The opinions expressed in this paper are those of the authors and do not necessarily reflect the views of the Ontario Tobacco Research Unit or any organization with which the authors are affiliated.

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ABSTRACT

Tobacco smoking long has been recognized as a major cause of death and disease. In recent years, however, there has been concern that non-smokers too may be at risk of adverse health effects from their exposure to ETS. A common strategy designed to protect non-smoking patrons of public places is to designate smoking and non-smoking areas. What remains unknown, however, is 1) what is the level of exposure to ETS for patrons and employees in the smoking areas of these establishments, and 2) to what degree do non-smoking areas protect patrons and employees in places which may be affected by ETS from other areas? To answer this question seventy-five representative locations across Toronto were selected randomly from a list of 3,500 establishments. The results suggest that the practice of designated non-smoking areas in restaurants, mall food courts, pool halls and bingo halls do not completely protect patrons and employees from exposure to ETS. In many cases, in fact, the exposure may be nearly as great as that found in the smoking areas of other locations. This suggests that the only truly effective protection may lie in the total prohibition of smoking in public places.



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INTRODUCTION

Tobacco smoking long has been recognized as a major cause of death and disease. In recent years, however, there has been concern that non-smokers too may be at risk of adverse health effects from their exposure to exhaled smoke and smoke produced by the burning end of cigarettes. Environmental tobacco smoke (ETS) commonly can be found in homes, workplaces, cars, restaurants and nightclubs where it represents a major source of air pollution. The Health risks for exposure to ETS have been documented by the Environmental Protection Agency in the United States,¹ which has declared that ETS belongs in the category of substances known as Group A carcinogens. Health Canada estimates that each year more than 300 deaths from lung cancer among Canadian non-smokers are caused by ETS.² Moreover, ETS has been shown to have other significant effects on the respiratory health, and to increase the risk of heart disease deaths, among non-smokers.

In response to these health concerns, laws have been created to protect non-smokers from ETS. Within Ontario, legislation has been enacted at both provincial and municipal levels to control levels of ETS in public places. For instance, the Ontario Tobacco Control Act now prohibits smoking in hospitals, schools, day nurseries and other locations (see 9.1:1-14, Ontario Tobacco Control Act). Furthermore, many municipal smoking by-laws across the province also restrict smoking in other enclosed public spaces (e.g. taxi cabs and municipal buildings).

A common strategy designed to protect non-smoking patrons from ETS in locations where smoking has not been prohibited, such as restaurants, pool halls, shopping mall food courts and bingo halls, is to designate smoking and non-smoking areas. In most cases, this means allotting a certain proportion of seating space smoke free. For example, in the City of Toronto, all restaurants must have at least 50 percent of their seating capacity designated as smoke free. What remains unknown, however, is: (1) what is the level of exposure to ETS for patrons and employees in the smoking areas of these establishments; and (2) to what degree do non-smoking areas protect patrons and employees from ETS in rooms which may be affected by second hand smoke from other areas? It is these questions that prompted the present study.

METHODS

Sample selection

Seventy-five representative locations across Toronto were randomly selected from a list of 3,500 establishments provided by the City of Toronto Department of Public Health. The sample included: 10 shopping mall food courts; 3 bingo halls; 6 pool halls and 56 restaurants (Shopping Mall Food Courts were not selected randomly. The food courts selected in the study were obtained by requesting permission from mall managers. Approximately 50 percent of all mall food courts in Toronto were sampled.)

Permission to test

Selected merchants were contacted by one of two Environmental Health students and asked to participate in the study. Those who agreed were informed that the study was for research purposes only, would not be used for reasons of enforcement. More than 90 percent of merchants first contacted volunteered to take part. If a selected location was unavailable (e.g. out-of-business), another on the list was picked randomly. All vendors were guaranteed anonymity and confidentiality.

Air monitoring

Monitoring Levels of ETS were measured by a passive air monitoring device constructed from a modified 37 mm diameter polystyrene air sampling cassette. An alligator clip was rivetted to the bottom of each cassette for convenient placement. A support pad was placed into the bottom of the cassette and then a treated filter. The Teflon-coated glass fibre filters were treated with an aqueous solution of 4% sodium bisulphate and 5% ethanol and then allowed to dry. The filter is then held in place by a polystyrene spacer whose lip was removed onto which a windscreen (Nucleopore filter) was glued. Similar monitors have been tested and used widely in the United States and have been shown to perform well under varying concentrations.³

In each sample location one nicotine monitoring device was placed in the smoking and another in the companion non-smoking area. These monitors were attached to walls eight feet

from ground level in the middle of each designated area. For example, in establishments where the smoking and non-smoking areas were contiguous, and the distance between the division of the smoking and non-smoking area to the far end of the smoking area was ten metres, the monitor in the smoking area was placed five metres from the smoking/non-smoking border.

In instances where the two areas were separate, monitors were placed half-way along one of the walls within smoking and non-smoking areas. All monitors were exposed for a seven-day period. After the devices were collected, they were placed in sealed plastic zip-lock bags and then were analyzed at the Ontario Ministry of Labour, Occupational Health and Safety Laboratory in Weston, Ontario. Gas chromatography with a specific nitrogen detector for nitrogen dioxide levels was used to test samples for levels of nicotine. Although this method of detecting nicotine vapour is an accepted technique used in other published studies⁴, the values that are reported can only be interpreted relative to one another.

RESULTS AND DISCUSSION

Table 1. Mean levels of airborne nicotine in smoking and non-smoking sections of selected locations.

LOCATION	Smoking Area (micrograms)		Non-Smoking Area (micrograms)		Mean value in non- smoking area as proportion of smoking area	Difference	
	<u>Mean</u>	<u>s.d.</u>	<u>Mean</u>	<u>s.d.</u>		<u>t</u>	<u>p</u>
Restaurants (n=54)	2.3	2.6	1.6	2.0	.69	4.0	.005
Food Courts (n=10)	3.8	4.3	1.6	1.6	.37	2.8	.02
Pool Halls (n=6)	4.2	1.3	2.8	2.0	.67	.95	.39
Bingo Halls (n=3)	9.5	2.4	5.3	2.4	.56	9.3	.01

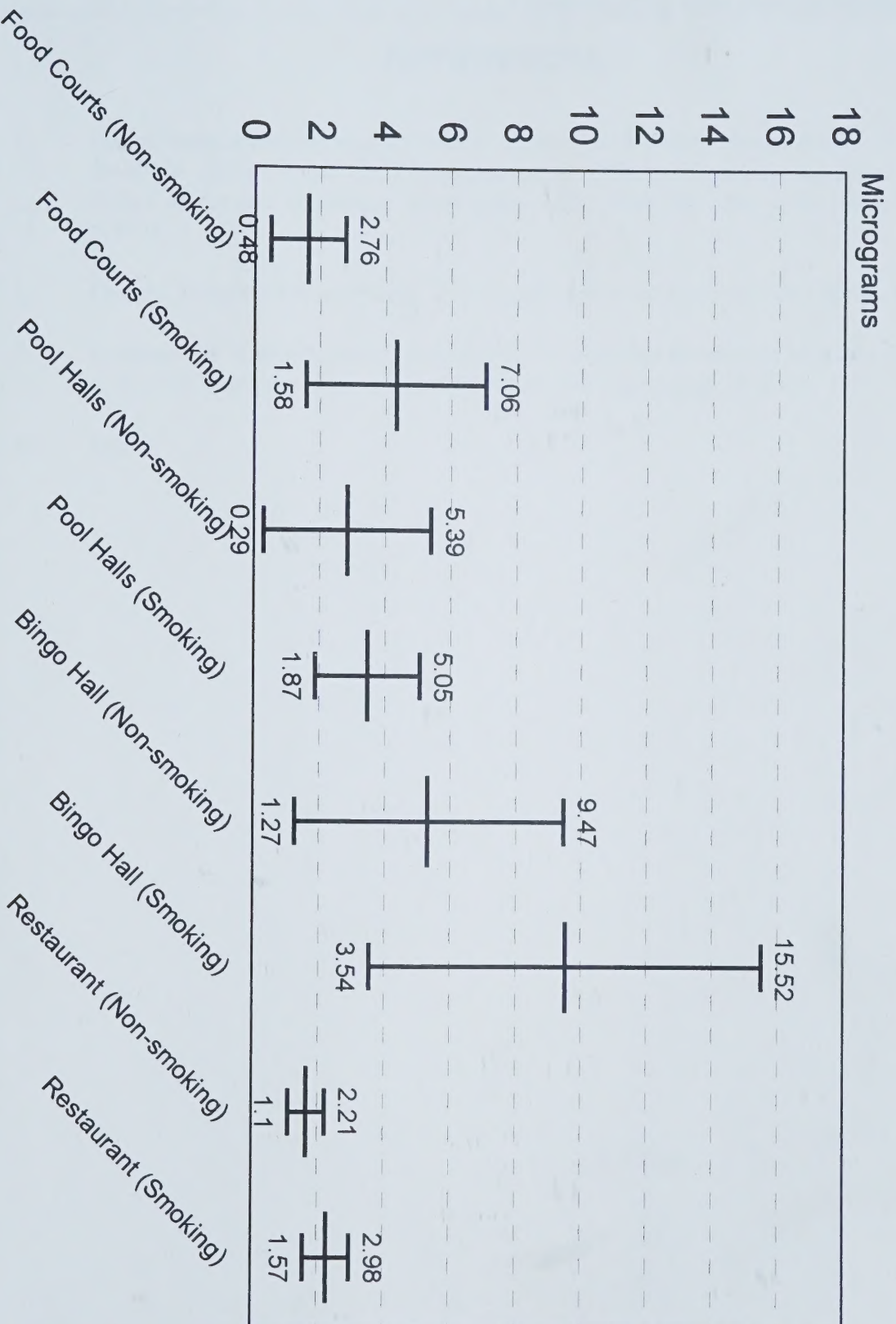
This study examined two questions: (1) what is the exposure to airborne nicotine for patrons and employees in the designated smoking and non-smoking areas of restaurants, food

courts, pool halls and bingo halls; and (2) what protection is afforded to patrons by a designated non-smoking area? Results reveal that even in designated smoking areas, exposure to ETS varies considerably across different types of premises. Although the sample of bingo halls was small, and may not be representative, the levels of nicotine found in them is far higher than in other places: reaching twice that in pool halls and four times that in restaurants. A similar pattern is found in the non-smoking areas. Even though the absolute level of nicotine in the non-smoking area of bingo halls is only about half that in the smoking area, it still is almost double that in pool halls, and over three times the amount in food courts and restaurants.

A comparison of nicotine levels detected in the smoking and non-smoking areas of each type of establishment suggests that the amount of protection offered differs by location, and that even though exposure to nicotine is reduced by the presence of a designated non-smoking area, it is not eliminated. The greatest difference between smoking and non-smoking areas was found in food courts, which often maintain physically separate locations for the two. The least, on the other hand, was found in restaurants whose locations often are adjacent to one another in a common room and share a common ventilation system. Although nicotine found in the non-smoking areas of bingo halls was considerably less than that in the smoking areas, it must be kept in mind that it still exceeds the levels in even the smoking areas of any other location.

To the extent that they reflect actual human exposure, these results clearly suggest that the current practice of designated non-smoking areas in restaurants, mall food courts, pool halls and bingo halls in the City of Toronto do not completely protect patrons and employees from the exposure to ETS. In many cases, in fact, the exposure may be as great as that found in the smoking areas of other locations. This suggests that the only truly effective protection may lie in the total prohibition of smoking in these places.

Figure 1. Mean and 95% confidence levels of airborne nicotine in smoking and non-smoking sections of selected locations



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The Ontario Tobacco Research Unit (OTRU) was established by the Ministry of Health in July 1993. Its mission is to undertake a program of research, development and dissemination of knowledge about effective tobacco control programs and policies. It will assure that existing knowledge is critically evaluated, summarized appropriately, and made available in the most useful form. In collaboration with individuals, groups, and agencies interested in and responsible for developing tobacco reduction programs and policies, the OTRU will lead in the identification of priority areas for knowledge development. The OTRU will produce a program of research based on these identified priorities. Finally, the OTRU will ensure that knowledge is disseminated widely to programmers and policy makers, to the research community and, where appropriate, to the general public.

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